

Remarks

By the present amendment and response, Applicants have amended claims 1, 3, 10, 13, 17, 19, 21, and 24; cancelled claims 2, 4, and 5; and added new claims 26-34. Consequently, claims 1, 3, and 6-34 are pending in the present application, with claims 1, 13, 21, 24, and 27 being independent claims.

Remarks addressing the objections and § 103(a) rejections contained in the Office Action mailed July 16, 2004 are set forth in turn below.

I. Objections to Claims 2, 3, 10, and 19 (Allowable Subject Matter)

At page 5 of the Office Action, the Examiner stated that “the prior art neither discloses nor fairly teaches a **planar porous membrane downstream of an optical detection region** in a device as claimed [by original claims 2, 3, 10, and 19].” (Emphasis added.) Consequently, the Examiner indicated that claims 2, 3, 10, and 19 were objected to as being dependent upon rejected base claims, but that such claims would be allowable if rewritten in independent form including all of the limitations of the pertinent base claims and any intervening claims.

In light of the Examiner's objections, Applicants have amended independent claim 1 to include all of the limitations of former claim 2 (cancelled herewith), and have amended independent claim 13 to include all of the limitations of former claim 19 (cancelled herewith). Claims 3 has been amended to depend from amended claim 1, and claim 10 has been amended to promote consistency with amended claim 1.

II. Obviousness Rejections

A. Rejections Under 35 U.S.C. § 103(a) Generally

Three requirements must be met for a *prima facie* case of obviousness. First the prior art reference(s) must teach all of the limitations of the claims. M.P.E.P. § 2143.03. Second, there must be a motivation to modify the reference or combine the teachings to produce the claimed invention. M.P.E.P. § 2143.01. Third, a reasonable expectation of success is required. M.P.E.P. § 2143.02. In addition, the teaching or suggestion to combine and the expectation of success must both be found in the prior art and not based on Applicant's disclosure. M.P.E.P. § 2143.

B. Rejection of claims 1, 4, 5, 6, 12, 21, and 22 over Ericson in view of Huber

Claims 1, 4, 5, 6, 12, 21, and 22 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Ericson, et al. (Anal. Chem. 2000, Vol. 72, pp. 81-87) (hereinafter "Ericson") in view of U.S. 4,165,219 to Huber, et al. (hereinafter "Huber").

As noted previously, the Examiner has already indicated that the prior art neither discloses nor fairly teaches a planar porous membrane downstream of an optical detection region in a device as claimed [by original claims 2, 3, 10, and 19] (Office Action, pg. 5). Independent claim 1 has been amended herewith to include the limitations of original claim 2; as a result, Applicants believe that amended claim 1 and all claims depending directly or indirectly thereon (i.e., claims 3 and 6-12) are novel and non-obvious over Ericson and Huber, whether taken alone or in combination. In a similar vein, independent claim 21 has been amended to clarify that the porous material adapted to elevate the backpressure within the optical detection region is a porous membrane. As a result, Applicants submit that amended independent claim 21, along with claim 22 that depends therefrom, are also

novel and non-obvious over Ericson and Huber, whether taken alone or in combination. As a result, withdrawal of the rejections of claims 1, 6, 12, 21, and 22 is respectfully requested.

Dependent claims 4 and 5 have been cancelled, thus mooted any rejections thereof.

C Rejection of claims 7-9, 13-18, 20, and 23-25 over Ericson in view of Huber, further in view of Soga

Claims 7-9, 13-18, 20, and 23-25 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Ericson in view of Huber as applied to claim 1, further in view of Soga et al. (US 2003/0230524)(hereinafter "Soga"). Specifically, the Examiner asserts that "Soga teaches a HPLC device having a fluidic distribution network comprising mobile phase supply, separation columns, optical detection regions each having light source and detector, where the device layers are interpenetrably bound, metal free, and stencil." (Office Action, pg. 3). Applicants respectfully submit that the Examiner is mistaken regarding the disclosure of Soga.

1. Disclosure of Soga (US 2003/0230524)

Soga is directed to a chromatographic chip that is constructed from a pair of transparent plate members, with the lower plate member defining grooves along its the upper surface and the upper plate member defining through-holes corresponding to certain of the grooves defined in the lower plate member. Soga, ¶¶ 0010, 0038-0043. The grooves have a relatively shallow depth (e.g., 10 micrometers) compared to the thickness (0.5 millimeter) of the plate member. Soga, ¶¶ 0038-0041. The grooves, which serve as channels or reservoirs, are formed using pattern transfer and micromachining techniques including photolithography, wet (chemical) etching, and laser etching. Soga, ¶¶ 0025-0028. Silica gel having a microporous structure is formed inside selected grooves to yield analysis channels. Soga, ¶¶ 0010, 0044-0046. While various materials, such as glass, quartz, silicon, plastics, and semiconductor substrates may be used for the plate members (Soga, ¶

0025), Soga discloses only the following three procedures for affixing plates together: (1) high temperature (i.e., 600-1000°C) fusion of glass plates in a vacuum or nitrogen substituted atmosphere (Soga, ¶ 0032); (2) high temperature fusion of quartz plates, at least one of which having a sputter-deposited glass film layers, in a vacuum or nitrogen substituted atmosphere (Soga, ¶ 0033); and anodic (“electrode”) bonding of glass and silicon plates at about 400C and an applied voltage of about –1 kV (Soga, ¶ 0033).

2. *Soga Fails To Disclose Stencils*

It is well-established that a patent applicant may be his own lexicographer, so long as (1) the meaning assigned to a term is not repugnant to its well-known usage, and (2) the special meaning is “sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention.”

Multiform Dessicants Inc. v. Medzam Ltd., 133 F.3d 1473, 1477, 45 USPQ2d 1429, 1432

(Fed. Cir. 1998); M.P.E.P. 2111.02. The present application specifically defines a “stencil” as:

... a material layer or sheet that is preferably substantially planar through which one or more variously shaped and oriented portions have been cut or otherwise removed through the entire thickness of the layer, and that permits substantial fluid movement within the layer (e.g., in the form of channels or chambers, as opposed to simple through-holes for transmitting fluid through one layer to another layer). The outlines of the cut or otherwise removed portions form the lateral boundaries of microstructures that are formed when a stencil is sandwiched between other layers such as substrates or other stencils.

Application, p. 5, ¶ 0024 (emphasis added). Thus, a stencil layer requires a channel or chamber defined through the entire thickness of the layer, and a stencil layer must be disposed between at least two other layers if is desired to seal such a channel or chamber against leakage to the surrounding environment. At least one stencil layer is required in each of claims 9, 10, 18, 23, and 29 of the present application.

In devices according to Soga, channels or reservoirs are fabricated as grooves in a surface of a plate member. Soga, ¶¶ 0010, 0038-0040. Such grooves are shallow

compared to the thickness of a plate member (e.g., 10 micrometers vs. 0.5 millimeter). Soga ¶¶ 0038-0041. Moreover, such grooves can be enclosed by affixing a second plate member over the first groove-defining plate member. Soga ¶ 0032. A plate member according to Soga having shallow grooves defined in one surface is not a "stencil layer" within the meaning of claims 9, 10, 18, 23, and 29 of the present application, since a stencil layer requires that at least one channel defining portion is cut through the entire thickness of the layer and permits substantial fluid movement within the layer. As a result, Soga cannot support obviousness rejections of any of claims 9, 10, 18, 23, and 29, and withdrawal of the rejections of these claims is respectfully requested.

3. *Soga Fails To Disclose Adhesiveless, Interpenetrably Bound Polymer Layers*

Each of pending claims 7, 16, and 27 require a plurality of adhesiveless polymeric device layers that are interpenetrably bound together to form a substantially sealed microstructure. While Soga mentions that various materials including plastics may be used for plate members (Soga, ¶ 0025), Soga fails to disclose any method for interpenetrably bonding adhesiveless polymeric device layers. Rather, Soga discloses only thermal fusion bonding of glass plate members, thermal fusion bonding of quartz plate members having sputter-deposited glass coatings, and anodic ("electrode") bonding of silicon and glass plate members. (Soga, ¶¶ 0032-0033.) In other words, Soga fails to teach or fairly suggest any method for adhesively bonding polymeric device layers. As a result, Soga cannot support obviousness rejections of any of claims 7, 16, and 27, and withdrawal of the rejections of these claims is respectfully requested..

4. *None of Ericson, Huber, and Soga Discloses or Suggests The Use of Porous Membranes As Claimed In The Present Application*

As noted previously, the Examiner has already conceded that the prior art neither discloses nor fairly teaches a planar porous membrane disposed downstream of an optical

detection region. Office Action, pg. 5. All of claims 7-9, 13-18, 20, and 23-25 require at least one porous membrane disposed downstream of at least one optical detection region. For at least this reason, none of Ericson, Huber, and Soga, whether taken separately or in combination, can support obviousness rejections of 7-9, 13-18, 20, and 23-25, and withdrawal of the rejections of these claims is respectfully requested.

D. Rejection of claims 7-9, 13-18, 20, and 23-25 over Ericson in view of Shimada

Claims 1, 4, 6, 11, 12, 21, and 22 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Ericson in view of Shimada (US 4,137,161). Specifically, the Examiner asserts that it would have been obvious to use a second column downstream of the detection region as taught by [Shimada] in the invention taught by Ericson to form a backpressure column. Office Action, pg. 5.

Independent claims 1 and 21 have both been amended to require the use of a porous membrane (i.e., to elevate the backpressure within an optical detection region). The Examiner has already conceded that the prior art neither discloses nor fairly teaches a planar porous membrane disposed downstream of an optical detection region. Office Action, pg. 5. Thus, claims 1 and 21 cannot be rendered obvious by any combination of Ericson and Shimada. Moreover, since dependent claims inherently include all the limitations of the claim incorporated by reference into the dependent claim (37 CFR 1.75(c)), dependent claims 4, 6, 11, 12, and 22 similarly cannot be rendered obvious by any combination of Ericson and Shimada. As a result, withdrawal of the rejections of claims 7-9, 13-18, 20, and 23-25 is respectfully requested.

E. New claims

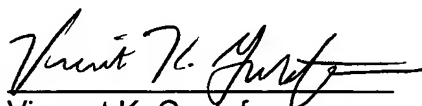
New claims 26-34 claim further salient aspects of the invention. No new matter has been added. Claim 26 depends from independent claim 24 and therefore requires at least one porous membrane disposed downstream of a plurality of optical detection regions. Claims 27-34 all require a plurality of adhesiveless polymeric device layers that are interpenetrably bound to form a substantially sealed microstructure. As noted previously, none of the references discussed by the Examiner (i.e., Ericson, Huber, Soga, or Shimada) teach or fairly suggest this limitation.

Conclusion

By virtue of the amendments and arguments provided herein, Applicants believe that all pending claims 1, 3, and 6-34 are in good condition for allowance, and respectfully request allowance thereof. If any additional information should be required in considering this Response, or if there are any questions or deficiencies with regard to this Response that can be addressed by telephone, the USPTO representative is encouraged to contact the undersigned directly at (626) 351-8200, ext. 6503.

Respectfully submitted,

Dated: October 14, 2004


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